

TITLE OF THE INVENTION

Polyisocyanurate Compositions and Composites

This application claims benefit of 60/108,611 filed 11/16/1998 and 60/108,612 filed 11/16/1998.

TECHNICAL FIELD

The invention relates to polyisocyanurate systems, fiber reinforced polyisocyanurate matrix composites, and manufacture of those composites by pultrusion.

BACKGROUND ART

Pultrusion is a highly cost effective method for making fiber reinforced, resin matrix composites. The primary raw materials used in pultrusion are resin and reinforcement. Fillers and additives such as calcium carbonate, clay, mica, pigments, UV stabilizers can be added to the resin to enhance the physical, chemical and mechanical properties of the pultruded product.

Pultrusion is typically done by the injection die or open bath process. The open bath process is the most common. The injection die process, however, is gaining importance due to environmental concerns about the large amounts of volatile contaminants released in the open bath process.

In a typical open bath process, reinforcement material in the form of fibers, mat or roving is pulled continuously through an open bath of resin to produce an impregnated reinforcement. The impregnated reinforcement is pulled through form plates to remove excess resin, and then through a curing die to cure the resin and yield a finished product.

In the injection die pultrusion process, reinforcement material is passed through a closed injection die that has resin injection ports. The resin is injected under pressure through the ports to impregnate the reinforcement material. The impregnated reinforcement is pulled through the injection die to produce a shaped product.

Resins which have been used in the open bath and injection die methods of pultrusion include thermoset resins such as unsaturated polyester, epoxy, phenolics, methacrylates and the like, as well as thermoplastic resins such as PPS, ABS, Nylon 6. Blocked polyurethane prepolymers also have been used. Polyester and epoxy resins are generally slower reacting than polyisocyanurates. In addition, the use of blocked polyurethane resins in pultrusion has the disadvantage of deblocking of the isocyanate which creates environmental concerns.

A need therefore exists for resins such as polyisocyanurate and polyurethane resins which may be used in pultrusion, especially injection die pultrusion, without these disadvantages.

DISCLOSURE OF THE INVENTION

The invention relates to polyisocyanurate systems, preferably miscible polyisocyanurate systems, having an isocyanate component and a polyol component. The